



Kaiser Permanente Health Care Seismic Retrofit

Full Mitigation Best Practice Story

State-wide, California

Oakland, CA - When the Loma Prieta earthquake struck the San Francisco Bay area in 1989, Kaiser Permanente, a health care organization founded in 1948, experienced damage to its administrative building in Oakland, which was evacuated and closed, and to its Santa Clara Medical Center, where the chiller and cooling towers were moved off their supports.



Following that event, in 1990 the Kaiser Permanente system began an aggressive seismic mitigation program. The first phase was to upgrade the structural status of its medical and administrative buildings. Kaiser hired two structural engineering firms to conduct thorough reviews of its 28 major medical centers and approximately 300 medical and administrative buildings in California. Building performance standards for operations were then developed for all the buildings. The standards established were to have 1) all acute care hospital buildings would remain in service following a major earthquake, and 2) all other buildings would protect occupants from serious injury or death but might not be operational immediately following a major earthquake. Next, Kaiser began funding work to either seismically retrofit its existing hospitals and buildings to these standards, to replace buildings that are too expensive or outdated to repair, and to vacate buildings that are no longer useful.

Non-structural mitigation including anchoring all major furniture, building and medical equipment has been mostly completed in Kaiser's buildings. Kaiser has also established an aggressive employee emergency preparedness program including funding for an amateur radio network that would link the company's facilities in northern and southern California.

Kaiser has started seismic mitigation work on many of its hospitals. Seismic improvements for this hospital include excavating under hospital buildings to reinforce foundations and joints, adding steel reinforced weight bearing walls to the hospital's exterior to function as shear walls and transfer drag stress, thus keeping stress off floor members of old hospital wings. Mitigation also includes strapping air dampers and ceiling light fixtures.

Kaiser's goal is to have all of its hospitals to be able to continue in service after earthquakes by the year 2008 and meet the functionality standard 22 years in advance of requirements set by California Senate Bill 1953. Extensive seismic retrofitting or replacement of hospitals by the year 2030 will be required.

Activity/Project Location

Geographical Area: **State-wide**

FEMA Region: **Region IX**

State: **California**

Key Activity/Project Information

Sector: **Private**
Hazard Type: **Earthquake**
Activity/Project Type: **Retrofitting, Non-structural; Retrofitting, Structural**
Activity/Project Start Date: **01/1990**
Activity/Project End Date: **Ongoing**
Funding Source: **Business Owner; Hazard Mitigation Grant Program (HMGP)**
Funding Recipient: **Critical Facility - Medical**
Funding Recipient Name: **Kaiser Permanente**

Activity/Project Economic Analysis

Cost: **\$2,000,000,000.00 (Estimated)**

Activity/Project Disaster Information

Mitigation Resulted From Federal
Disaster? **Yes**
Federal Disaster #: **845 , 10/18/1989**
Value Tested By Disaster? **No**
Repetitive Loss Property? **Unknown**

Reference URLs

Reference URL 1: **<http://www.nifc.gov>**
Reference URL 2: **<http://www.oes.ca.gov/Operational/OESHome.nsf/1?OpenForm>**

Main Points

- Upgrade the structural status of all medical and administrative buildings, and work to either seismically retrofit its existing hospitals and buildings to these standards, to replace buildings that are too expensive or outdated to repair, and to vacate buildings that are no longer useful.
- Kaiser has started seismic mitigation work on many of its hospitals.
- Kaiser's goal is to have all of its hospitals to be able to continue in service after earthquakes by the year 2008 and meet the functionality standard 22 years in advance of requirements set by California Senate Bill 1953. Extensive seismic retrofitting or replacement of hospitals by the year 2030 will be required.